

## WHAT IS CLAIMED IS:

1. A method for controlling silica or silicate scale formation in an aqueous water system with silica contributed by source water, the methods of the present invention comprising the steps:
  - a) removing hardness ions from said source water;
  - b) controlling the conductivity of said aqueous system water such that said aqueous system water possesses a measurable conductivity of at least 1  $\mu$ mhos ; and
  - c) elevating and maintaining the pH of said aqueous system water such that said aqueous system water possesses a pH of approximately 9.0 or greater.
2. The method of Claim 1 wherein in step a), said hardness ions comprise ions of calcium and magnesium.
3. The method of Claim 1 wherein said aqueous system water contains soluble SiO<sub>2</sub> residual that is at least 125 mg/L.
4. The method of Claim 3 wherein said aqueous system water contains soluble SiO<sub>2</sub> in excess of 200 mg/L.
5. The methods of the present invention of Claim 3 wherein in step a), said hardness ions are removed in amounts equal to or less than approximately 20% of the SiO<sub>2</sub> present within said source water.
6. The methods of the present invention of Claim 3 wherein in step a), said hardness ions are removed in amounts equal to or less than approximately 5% of the SiO<sub>2</sub> present within said source water.
7. The method of Claim 1 wherein in step c), said pH is maintained at 9.6 or higher.
8. The method of Claim 1 wherein in step a), said hardness ions are removed via a method selected from the group consisting of ion exchange, selective

ion removal with reverse osmosis, reverse osmosis, electro chemical removal, chemical precipitation, evaporation and distillation.

9. The method of Claim 1 wherein in step c), said pH is increased by adding an alkali agent.
10. The method of Claim 9 wherein said alkali agent comprises sodium hydroxide.
11. The method of Claim 1 wherein in step c), said pH is elevated by evaporating a portion of said aqueous system water.
12. The method of Claim 1 wherein in step c), said pH is elevated by distilling a portion of said aqueous system water.
13. The method of Claim 1 wherein in step c), said aqueous system water comprises water utilized for cooling processes, water utilized for cooling tower systems, water utilized for evaporative cooling, water utilized for cooling lakes or ponds, water utilized for enclosed or secondary cooling and heating loops.
14. A method for inhibiting corrosion of a metallic substance in an aqueous system wherein said aqueous system derives water from make-up source water, the methods of the present invention comprising the steps:
  - a) removing hardness ions from said source water;
  - b) controlling the conductivity of said aqueous system water such that said aqueous system water possesses a measurable conductivity of at least 1  $\mu$ mhos ; and
  - c) elevating and maintaining the pH of said aqueous system water such that said aqueous system water possesses a pH of approximately 9.0 or greater.
15. The method of Claim 14 wherein in step a), said hardness ions comprise ions of calcium and magnesium.
16. The method of Claim 14 wherein said aqueous system water contains soluble SiO<sub>2</sub> of greater than 10 mg/L.

17. The method of Claim 16 wherein said aqueous system water contains soluble  $\text{SiO}_2$  residual that is between 10 mg/L to 200 mg/L.
18. The method of Claim 15 wherein in step a), said hardness ions are removed in amounts equal to or less than approximately 20% of the  $\text{SiO}_2$  present within said source water.
19. The method of Claim 15 wherein in step a), said hardness ions are removed in amounts equal to or less than approximately 5 % of the  $\text{SiO}_2$  present within said source water.
20. The method of Claim 14 wherein in step c), said pH is maintained at 9.6 or higher.
21. The method of Claim 14 wherein in step a), said hardness ions are removed via a method selected from the group consisting of ion exchange, selective ion removal with reverse osmosis, reverse osmosis, electro chemical removal, chemical precipitation, evaporation and distillation.
22. The method of Claim 14 wherein in step c), said pH is increased by adding an alkali agent.
23. The method of Claim 20 wherein said alkali agent comprises sodium hydroxide.
24. The method of Claim 14 wherein in step c), said pH is elevated by evaporating a portion of said aqueous system water.
25. The method of Claim 14 wherein in step c), said pH is elevated by distilling a portion of said aqueous system water.
26. The method of Claim 14 wherein said metallic substrate is selected from the group consisting of carbon steel, copper, copper alloy and stainless steel alloy.
27. The method of Claim 1 wherein prior to step a), said methods of the present invention comprises the step:
  - a) analyzing said source water to determine the concentration of  $\text{SiO}_2$  present therein.

28. The method of Claim 14 wherein prior to step a), said methods of the present invention comprises the step:
  - a) analyzing said source water to determine the concentration of  $\text{SiO}_2$  present therein.
29. The method of Claim 1 wherein in step b), said conductivity of said aqueous system water is controlled such that said aqueous system water possesses a conductivity of at least 500  $\mu\text{mhos}$ .
30. The method of Claim 14 wherein in step b), said conductivity of said aqueous system water is controlled such that said aqueous system water possesses a conductivity of at least 500  $\mu\text{mhos}$ .
31. The method of Claim 1, wherein said source water contains silica in an amount of 4000mg/L or less.
32. The method of Claim 17 wherein said aqueous system water contains soluble  $\text{SiO}_2$  of at least 200 mg/L.